

WHAT IS CLAIMED IS:

1. A transgenic mouse comprising a somatic cell, comprising:

(a) in a first chromosome of a chromosome pair, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

(b) at a homologous location of a second chromosome of the chromosome pair, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site; and

(c) a recombinase functionally expressed by the cell, and which promotes recombination between the target sites of the first and second chromosomes;

wherein recombinase-promoted somatic mitotic recombination between the target sites yields alternative pairs of X- or Z-segregated progeny cells,

wherein the X-segregated progeny cells comprise a first progeny cell comprising the first chromosome, and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a second progeny cell comprising the second chromosome, and a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker, and

wherein the Z-segregated progeny cells comprise a first progeny cell comprising the first chromosome and the second chromosome, and a second progeny cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

wherein the first X-segregated progeny cell produces a first marker-specific signal, the second X-segregated progeny cell produces a second marker-specific signal, the first Z-segregated progeny cell produces neither a first nor second marker-specific signal, and the second Z-segregated progeny cell produces both a first and a second marker specific-signal.

2. The mouse of claim 1, wherein the recombinase and target site are selected from the group consisting of Cre/loxP and FLP/frt.

3. The mouse of claim 1, wherein the first and second markers are fluorescent proteins selected from the group consisting of GFP and RFP.

4. The mouse of claim 2, wherein the recombinase and target site are Cre/loxP, and first and second markers are GFP and RFP.

5. The mouse of claim 1, wherein the first and second markers are transcriptional regulators, such as Gal4.

6. The mouse of claim 1, wherein functional expression of the recombinase is restricted by a cell-type specific promoter.

7. The mouse of claim 1, wherein functional expression of the recombinase is temporally restricted by administration of a drug selected from the group consisting of tamoxifen and doxycycline.

8. A method to generate and mark chromosome recombination in somatic cells in a mouse according to claim 1, the method comprising the steps of:

(a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

(b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

wherein the cell encodes a recombinase which promotes recombination between the target sites of the first and second chromosomes; and

(c) growing the cell to obtain a mouse comprising differentiated progeny cells of the pluripotent cell, wherein recombinase-promoted somatic mitotic recombination between the target sites in a differentiated progeny cell yields alternative pairs of X- or Z-segregated progeny cells,

wherein the X-segregated progeny cells comprise a first progeny cell comprising the first chromosome, and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a second progeny cell comprising the second chromosome, and a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker, and

wherein the Z-segregated progeny cells comprise a first progeny cell comprising the first chromosome and the second chromosome, and a second progeny cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

wherein the first X-segregated progeny cell produces a first marker-specific signal, the second X-segregated progeny cell produces a second marker-specific signal, the first Z-segregated progeny cell produces neither a first nor second marker-specific signal, and the second Z-segregated progeny cell produces both a first and a second marker specific-signal.

9. A method to generate and mark chromosome recombination in somatic cells in a mouse according to claim 2, the method comprising the steps of:

(a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

(b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

wherein the cell encodes a recombinase which promotes recombination between the target sites of the first and second chromosomes; and

(c) growing the cell to obtain a mouse comprising differentiated progeny cells of the pluripotent cell, wherein recombinase-promoted somatic mitotic recombination between the target sites in a differentiated progeny cell yields alternative pairs of X- or Z-segregated

progeny cells,

wherein the X-segregated progeny cells comprise a first progeny cell comprising the first chromosome, and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a second progeny cell comprising the second chromosome, and a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker, and

wherein the Z-segregated progeny cells comprise a first progeny cell comprising the first chromosome and the second chromosome, and a second progeny cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

wherein the first X-segregated progeny cell produces a first marker-specific signal, the second X-segregated progeny cell produces a second marker-specific signal, the first Z-segregated progeny cell produces neither a first nor second marker-specific signal, and the second Z-segregated progeny cell produces both a first and a second marker specific-signal.

10. A method to generate and mark chromosome recombination in somatic cells in a mouse according to claim 3, the method comprising the steps of:

(a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

(b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

wherein the cell encodes a recombinase which promotes recombination between the target sites of the first and second chromosomes; and

(c) growing the cell to obtain a mouse comprising differentiated progeny cells of the pluripotent cell, wherein recombinase-promoted somatic mitotic recombination between the

target sites in a differentiated progeny cell yields alternative pairs of X- or Z-segregated progeny cells,

wherein the X-segregated progeny cells comprise a first progeny cell comprising the first chromosome, and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a second progeny cell comprising the second chromosome, and a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker, and

wherein the Z-segregated progeny cells comprise a first progeny cell comprising the first chromosome and the second chromosome, and a second progeny cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

wherein the first X-segregated progeny cell produces a first marker-specific signal, the second X-segregated progeny cell produces a second marker-specific signal, the first Z-segregated progeny cell produces neither a first nor second marker-specific signal, and the second Z-segregated progeny cell produces both a first and a second marker specific-signal.

11. A method to generate and mark chromosome recombination in somatic cells in a mouse according to claim 4, the method comprising the steps of:

(a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

(b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

wherein the cell encodes a recombinase which promotes recombination between the target sites of the first and second chromosomes; and

(c) growing the cell to obtain a mouse comprising differentiated progeny cells of the

pluripotent cell, wherein recombinase-promoted somatic mitotic recombination between the target sites in a differentiated progeny cell yields alternative pairs of X- or Z-segregated progeny cells,

wherein the X-segregated progeny cells comprise a first progeny cell comprising the first chromosome, and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a second progeny cell comprising the second chromosome, and a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker, and

wherein the Z-segregated progeny cells comprise a first progeny cell comprising the first chromosome and the second chromosome, and a second progeny cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

wherein the first X-segregated progeny cell produces a first marker-specific signal, the second X-segregated progeny cell produces a second marker-specific signal, the first Z-segregated progeny cell produces neither a first nor second marker-specific signal, and the second Z-segregated progeny cell produces both a first and a second marker specific-signal.

12. A method to generate and mark chromosome recombination in somatic cells in a mouse according to claim 5, the method comprising the steps of:

(a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

(b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

wherein the cell encodes a recombinase which promotes recombination between the target sites of the first and second chromosomes; and

(c) growing the cell to obtain a mouse comprising differentiated progeny cells of the pluripotent cell, wherein recombinase-promoted somatic mitotic recombination between the target sites in a differentiated progeny cell yields alternative pairs of X- or Z-segregated progeny cells,

5 wherein the X-segregated progeny cells comprise a first progeny cell comprising the first chromosome, and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a second progeny cell comprising the second chromosome, and a recombined variant of the first chromosome comprising the promoter operably linked to a sequence
10 encoding the N- and C-terminal portions of the second marker, and

wherein the Z-segregated progeny cells comprise a first progeny cell comprising the first chromosome and the second chromosome, and a second progeny cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined
15 variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

wherein the first X-segregated progeny cell produces a first marker-specific signal, the second X-segregated progeny cell produces a second marker-specific signal, the first Z-segregated progeny cell produces neither a first nor second marker-specific signal, and the
20 second Z-segregated progeny cell produces both a first and a second marker specific-signal.

13. A method to generate and mark chromosome recombination in somatic cells in a mouse according to claim 6, the method comprising the steps of:

(a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a
25 polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

(b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably
30 linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

wherein the cell encodes a recombinase which promotes recombination between the

target sites of the first and second chromosomes; and

(c) growing the cell to obtain a mouse comprising differentiated progeny cells of the pluripotent cell, wherein recombinase-promoted somatic mitotic recombination between the target sites in a differentiated progeny cell yields alternative pairs of X- or Z-segregated progeny cells,

wherein the X-segregated progeny cells comprise a first progeny cell comprising the first chromosome, and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a second progeny cell comprising the second chromosome, and a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker, and

wherein the Z-segregated progeny cells comprise a first progeny cell comprising the first chromosome and the second chromosome, and a second progeny cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

wherein the first X-segregated progeny cell produces a first marker-specific signal, the second X-segregated progeny cell produces a second marker-specific signal, the first Z-segregated progeny cell produces neither a first nor second marker-specific signal, and the second Z-segregated progeny cell produces both a first and a second marker specific-signal.

14. A method to generate and mark chromosome recombination in somatic cells in a mouse according to claim 7, the method comprising the steps of:

(a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

(b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

wherein the cell encodes a recombinase which promotes recombination between the target sites of the first and second chromosomes; and

(c) growing the cell to obtain a mouse comprising differentiated progeny cells of the pluripotent cell, wherein recombinase-promoted somatic mitotic recombination between the target sites in a differentiated progeny cell yields alternative pairs of X- or Z-segregated progeny cells,

wherein the X-segregated progeny cells comprise a first progeny cell comprising the first chromosome, and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a second progeny cell comprising the second chromosome, and a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker, and

wherein the Z-segregated progeny cells comprise a first progeny cell comprising the first chromosome and the second chromosome, and a second progeny cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

wherein the first X-segregated progeny cell produces a first marker-specific signal, the second X-segregated progeny cell produces a second marker-specific signal, the first Z-segregated progeny cell produces neither a first nor second marker-specific signal, and the second Z-segregated progeny cell produces both a first and a second marker specific-signal.

15. The method of claim 8, wherein the pluripotent cell is an ES cell.

16. The method of claim 8, wherein the pluripotent cell is an egg cell.

17. A method to generate and mark chromosome recombination in somatic cells in a mouse according to claim 1, the method comprising the steps of:

(a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by

a recombinase target site;

(b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

wherein the cell encodes a recombinase which promotes recombination between the target sites of the first and second chromosomes; and

(c) growing the cell to obtain a mouse comprising differentiated progeny cells of the pluripotent cell, wherein recombinase-promoted somatic recombination between the target sites in a differentiated progeny cell yields a recombined cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

wherein the recombined cell produces both a first and a second marker specific-signal.

18. A method to generate and mark chromosome recombination in somatic cells in a mouse according to claim 2, the method comprising the steps of:

(a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

(b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

wherein the cell encodes a recombinase which promotes recombination between the target sites of the first and second chromosomes; and

(c) growing the cell to obtain a mouse comprising differentiated progeny cells of the pluripotent cell, wherein recombinase-promoted somatic recombination between the target sites in a differentiated progeny cell yields a recombined cell comprising a recombined

variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

5 wherein the recombined cell produces both a first and a second marker specific-signal.

19. A method to generate and mark chromosome recombination in somatic cells in a mouse according to claim 3, the method comprising the steps of:

10 (a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

15 (b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

 wherein the cell encodes a recombinase which promotes recombination between the target sites of the first and second chromosomes; and

20 (c) growing the cell to obtain a mouse comprising differentiated progeny cells of the pluripotent cell, wherein recombinase-promoted somatic recombination between the target sites in a differentiated progeny cell yields a recombined cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

25 wherein the recombined cell produces both a first and a second marker specific-signal.

30 20. A method to generate and mark chromosome recombination in somatic cells in a mouse according to claim 4, the method comprising the steps of:

 (a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a

polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

(b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

wherein the cell encodes a recombinase which promotes recombination between the target sites of the first and second chromosomes; and

(c) growing the cell to obtain a mouse comprising differentiated progeny cells of the pluripotent cell, wherein recombinase-promoted somatic recombination between the target sites in a differentiated progeny cell yields a recombined cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

wherein the recombined cell produces both a first and a second marker specific-signal.

21. A method to generate and mark chromosome recombination in somatic cells in a mouse according to claim 5, the method comprising the steps of:

(a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

(b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

wherein the cell encodes a recombinase which promotes recombination between the target sites of the first and second chromosomes; and

(c) growing the cell to obtain a mouse comprising differentiated progeny cells of the

pluripotent cell, wherein recombinase-promoted somatic recombination between the target sites in a differentiated progeny cell yields a recombined cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

wherein the recombined cell produces both a first and a second marker specific-signal.

22. A method to generate and mark chromosome recombination in somatic cells in a mouse according to claim 6, the method comprising the steps of:

(a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

(b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

wherein the cell encodes a recombinase which promotes recombination between the target sites of the first and second chromosomes; and

(c) growing the cell to obtain a mouse comprising differentiated progeny cells of the pluripotent cell, wherein recombinase-promoted somatic recombination between the target sites in a differentiated progeny cell yields a recombined cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

wherein the recombined cell produces both a first and a second marker specific-signal.

23. A method to generate and mark chromosome recombination in somatic cells in a mouse

according to claim 7, the method comprising the steps of:

(a) introducing in a first chromosome of a chromosome pair of a pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of a first marker and a C-terminal portion of a second marker separated by a recombinase target site;

(b) introducing at a homologous location of a second chromosome of the chromosome pair of the pluripotent cell, a polynucleotide comprising a promoter operably linked to a chimeric sequence encoding an N-terminal portion of the second marker and a C-terminal portion of the first marker separated by a recombinase target site,

wherein the cell encodes a recombinase which promotes recombination between the target sites of the first and second chromosomes; and

(c) growing the cell to obtain a mouse comprising differentiated progeny cells of the pluripotent cell, wherein recombinase-promoted somatic recombination between the target sites in a differentiated progeny cell yields a recombined cell comprising a recombined variant of the first chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the first marker; and a recombined variant of the second chromosome comprising the promoter operably linked to a sequence encoding the N- and C-terminal portions of the second marker,

wherein the recombined cell produces both a first and a second marker specific-signal.

24. The method of claim 17, wherein the pluripotent cell is an ES cell.

25. The method of claim 17, wherein the pluripotent cell is an egg cell.